Alcoholic Beverage Preferences and Associated Drinking Patterns and Risk Behaviors Among High School Youth

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Background: Very little is known about the types of alcoholic beverages preferred by youth in the U.S. and the relationship between beverage preference and demographic and behavioral characteristics of these youth.

Purpose: To determine the type of alcoholic beverages consumed by adolescent drinkers and how it varies by drinking patterns.

Methods: In 2010, an analysis was performed using 2007 data from the Youth Risk Behavior Survey (YRBS) conducted among public school students in eight states that included a question on the type of alcohol usually consumed. Analysis was restricted to the 7723 youth who reported consuming at least one drink of alcohol in the past 30 days. Beverage type preferences were analyzed by demographic factors, drinking patterns, and other health-risk behaviors. Logistic regression analyses were conducted to examine the correlates of type-specific alcohol consumption.

Results: Liquor was the strongly preferred alcoholic beverage of choice (43.8%), followed by beer (19.2%) and malt beverages (17.4%), with a very low preference for wine (3.7%) or wine coolers (3.4%). A higher preference for liquor or beer was observed among older youth, among those with a riskier pattern of alcohol consumption (e.g., greater frequency of consumption, binge drinking, or drinking and driving), and among youth who engaged in other risk behaviors.

Conclusions: Riskier patterns of drinking and other health-risk behaviors are associated with an increased preference for hard liquor and beer. Improved surveillance of alcoholic beverage preferences among youth will enable a better understanding of the factors related to youth drinking, allowing the development of more effective interventions.

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Introduction

Excessive alcohol consumption contributes to approximately 4600 deaths and 275,000 years of life lost among underage youth annually in the U.S.[1] Despite slight declines in the past decade, almost half of high school–aged youth report past-month alcohol consumption, mostly in the form of binge drinking,[2] and alcohol use among adolescents remains a major public health problem.[2–6] Little is known, however, about the specific types of alcoholic beverages that underage youths consume, how this beverage-specific profile differs by drinking pattern, or what factors predict the type of alcohol that youths consume.

Identifying the types of alcoholic beverages that youth consume would contribute toward a better understanding of the motivating factors underlying underage drinking behavior.[7] There is evidence that preferences for particular types of alcoholic beverages are associated with different drinking patterns.[7–19] Kuntsche et al., for example, have described wine as being consumed in moderation as a social habit, beer and spirits as most often being used to get drunk, and alcopops as occupying a middle ground.[7] Other studies have identified spirits consump-

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tion to be related to a desire to feel the effects of alcohol quickly,[8,19] whereas beer consumption has been associated with risky drinking, including binge drinking, heavy episodic drinking, and drunk driving.[9,11–15]

Because numerous evidence-based prevention strategies, including excise tax policy and alcohol sales and marketing regulation, are beverage-specific,[10] understanding the specific types of alcoholic beverages consumed by young people could also inform the development of appropriate beverage-specific policy and practice interventions. In addition, understanding the relationship between the types of alcoholic beverages that youth prefer and the alcohol source, drinking location, context, and relationship with other health-risk behaviors would provide clues as to the factors that influence youth drinking behavior.

Although several studies have investigated adolescent consumption of various types of alcoholic beverages (e.g., wine, beer, spirits) in other countries,[7–9] there is a paucity of such data in the U.S. There have been only two published studies on type-specific alcoholic beverage consumption among adolescents in the U.S.[20,21] In one study,[20] Roeber et al. reported type-specific consumption of alcoholic beverages among 9th–12th-grade students in four states in 2005 based on the Youth Risk Behavior Survey (YRBS). In the second study,[21] Cremeens et al. used the same data set to examine the type of alcohol consumed and its relationship to binge drinking behavior. However, neither study assessed whether beverage choice was related to drinking context or other personal health-risk behaviors and neither reported the relationship between type-specific consumption and the location of drinking or the source of alcohol.

In this paper, data from the 2007 Youth Risk Behavior Survey in eight states were used to examine beverage-specific drinking patterns among U.S. adolescents. The purposes of the present study were to determine (1) the types of alcoholic beverages preferred by adolescents and how these beverage preferences differ among demographic groups and (2) how alcoholic beverage preferences differ by age, drinking patterns, and other health-risk behaviors.

Methods

Overview

Data were analyzed from the 2007 state Youth Risk Behavior Survey (YRBS), a school-based questionnaire survey of 9th–12th-grade students, in eight states: Arkansas, Florida, Georgia, Hawaii, New Mexico, North Dakota, Utah, and Vermont. Each of these states included an additional question in its 2007 survey that ascertained the type of alcoholic beverage usually consumed by respondents who reported drinking alcohol in the past 30 days.

Sampling

In 2007, these states conducted their survey using a two-stage cluster sample design in order to produce data representative of the state's public school students in Grades 9–12.[3] The first level of clustering was the school level. All public schools were included in the sampling frame. Schools were selected such that their probability of selection was proportional to their enrollment in Grades 9–12.[22] The second sampling frame consisted of classes within the chosen schools. All classes in a required subject or all classes meeting during a particular time period were included in the sampling frame. Equal probability sampling of classes was conducted and all students in selected classes were eligible to participate.

The student sample sizes for the eight states ranged from 1191 (Hawaii) to 8453 (Vermont), with a total sample size of 24,622 across the eight states. School response rates ranged from 76% (Arkansas) to 100% (Vermont), and student response rates ranged from 63% (Hawaii) to 89% (Georgia), resulting in overall response rates ranging from 60% to 82%.[3]

Analyses were restricted to respondents who had consumed at least one alcoholic beverage during the past 30 days (n=8694), which represented 37.8% of the total sample. After deleting respondents who failed to answer the question about alcoholic beverage type preference, the total sample size was 7723.

Data were weighted to represent each state's public school student population for Grades 9–12. Individual sample weights were applied to each record to adjust for student nonresponse and poststratification to the gender, race/ethnicity, and grade-level distribution in that state.

Measures

Alcohol beverage preference was assessed among current drinkers, who were defined as respondents who indicated having had at least one drink of alcohol on at least 1 day during the 30 days prior to survey administration. Alcoholic beverage type was assessed with the question *During the past 30 days, what type of alcohol did you usually drink?* The possible responses were *beer*; *liquor (such as vodka, rum, scotch, bourbon, or whiskey)*; *wine*; *wine coolers (such as Bartles and James or Seagrams)*; *malt beverages (such as Smirnoff Ice, Bacardi Silver, or Hard Lemonade)*; *some other type*; or *no usual type*.

Beverage type preferences were analyzed by state; age; grade; gender; race/ethnicity; frequency of binge drinking (defined as having five or more drinks of alcohol in a row during the past 30 days); frequency of drinking; and driving after drinking (defined as having driven a car shortly after drinking). Beverage type preferences also were analyzed in relation to the usual source of alcohol and the location where alcohol is usually consumed.

Alcohol beverage preferences were analyzed in relation to the following other health-risk behaviors: wearing a seat belt, riding in a car driven by someone who had been drinking alcohol, carrying a weapon, being in a physical fight, feeling helpless, considering suicide, current smoking, marijuana use, TV viewing, number of sexual partners, and unprotected sex. TV viewing was included as a potential correlate of alcoholic beverage type preference because it has been shown to be related to youth alcohol consumption, possibly because of alcohol marketing and the positive portrayal of drinking on TV.[23–25]

Analysis

Analyses were conducted in 2010 with SAS, version 9.1, using procedures that account for the complex survey design and that allowed weighting of the data to produce estimates that were representative of the state school student populations.[26] The analysis relied on a Taylor series variance estimation, which accounts for the clustering and stratification in the survey sampling design.[27]

Both state-specific and pooled analyses across all eight states were conducted. For pooled analyses, an additional weight was employed in order to account for the different student sample sizes in each state and for the differences in state populations in the age range of the sample. One weighting factor accounted for the sample size in each state in order to ensure that responses from each state had an equal influence on the estimation of pooled proportions. A second weighting factor accounted for the population of those aged 10–19 years in each state (based on 2007 age-specific population projections from the U.S. Census Bureau[28]) in order to ensure that states with larger populations had the proper proportionate influence on pooled estimates. By using these two weighting factors, pooled estimates were designed to be representative of the combined population of these eight states.

Logistic regression analyses were conducted to examine the correlates of type-specific alcohol consumption. The outcome variable in each regression was preference for a particular type of alcoholic beverage (i.e., liquor, beer, malt beverages, wine coolers, wine, and beer/liquor combined) compared to all other categories (including "other" and "no usual type"). The independent variables included age, gender, race/ethnicity, usual source of alcohol, usual location of drinking, frequency of drinking, and frequency of binge drinking. All independent variables were included in each model as the aim was to investigate the independent effect of each of these variables on alcoholic beverage type preferences. The other health behaviors were not included in these models in order to avoid multicollinearity, which could have invalidated the findings.

Results

In each state except North Dakota, liquor was the most prevalent type of alcohol usually consumed by 9th–12th-grade students in 2007 (median=43.7%, range=33.9%–45.8%; Appendix A, available online at www.ajpm-online.net). Beer was generally the second most prevalent type of alcohol consumed (median=22.7%, range=17.4%–35.9%), followed closely by malt beverages (median=16.4%, range=12.4%–22.4%). Wine and wine coolers were not reported as the usual alcoholic beverage consumed by more than 4.3% of the youth in any state.

For pooled state data, liquor was the strongly preferred alcoholic beverage of choice (43.8%), followed by beer (19.2%) and malt beverages (17.4%; Table 1). Boys were more likely to prefer liquor and beer, whereas girls were more likely to prefer malt beverages, wine coolers, and wine. Older age was associated with increasing preference for liquor and beer and decreasing preference for malt beverages and wine coolers. Black adolescents were much more likely to prefer malt beverages and much less likely to prefer beer compared with those of any other race or ethnicity.

A riskier pattern of alcohol consumption (both for frequency of drinking and of binge drinking) was associated with an increased preference for liquor and beer and a decreased preference for other beverages (Table 1). Driving after drinking was associated with increased beer consumption and decreased consumption of malt beverages, wine coolers, and wine. Preferences for alcoholic beverages type by usual source of alcohol and usual location of drinking tended to mirror the overall preference pattern in the sample.

The use of other drugs (cigarettes and marijuana) was associated with an increased preference for liquor and beer and a decreased preference for malt beverages, wine, and wine coolers (Table 2). In general, youth who engaged in other risk behaviors were more likely to usually consume liquor. For example, 48.4% of the youth who reported having been in a physical fight preferred liquor, compared to 40.0% of the youth who had not been in a physical fight. Nearly half (49.9%) of the youth who carried a weapon preferred liquor compared to 40.8% of the youth who did not carry a weapon.

In regression models, older adolescents were significantly more likely to report usually drinking beer (OR=1.60, 95% CI=1.002, 2.56, for youth aged ≥18 years compared to those aged 12–14 years), and significantly less likely to report usually drinking malt beverages or wine coolers (Appendix B, available online at ajpm-online.net). Girls were less likely to prefer beer and more likely to prefer malt beverages and wine coolers, as were black adolescents. Hispanic youth were more likely than white youth to prefer malt beverages, and less likely to prefer liquor or beer.

Usual source of alcohol was associated significantly with the type of alcohol usually consumed for only a few variables. Compared to youth whose usual source of alcohol was *other*, those whose usual source was buying alcohol in a store were more likely to usually drink beer (OR=1.81; 95% CI=1.14, 2.87). Youths whose usual source of alcohol was a bar or restaurant were less likely to usually drink wine coolers. Youths whose usual source of alcohol was to have someone buy alcohol for them were more likely to usually drink malt beverages.

Compared to youths whose usual location of drinking was *other*, youths whose usual drinking location was in the home were less likely to usually drink liquor (OR=0.46, 95% CI=0.29, 0.74). Those who usually drank alcohol in another person's home or in a public place were less likely to prefer liquor and more likely to prefer beer.

A high frequency of drinking was associated with a preference for liquor and a decreased preference for malt

Table 1. Usual alcoholic beverage type[a] among 9th- to 12th-grade students by demographic and drinking behavior characteristics—eight states combined,[b] % (SE)

Characteristic (%)	Liquor	Beer	Malt beverages	Wine coolers	Wine	Other	No usual type
Overall (*n*=7723)	43.8 (1.1)	19.2 (1.0)	17.4 (0.7)	3.4 (0.5)	3.7 (0.4)	3.5 (0.4)	9.1 (0.6)
Gender							
Male (49.6)	47.1 (1.6)	25.1 (1.6)	11.1 (0.8)	1.5 (0.5)	2.8 (0.6)	2.7 (0.4)	9.6 (1.0)
Female (74.7)	40.5 (1.6)	13.3 (1.0)	23.7 (1.1)	5.2 (0.7)	4.5 (0.6)	4.1 (0.6)	8.7 (0.7)
Age (years)							
12–14 (7.4)	39.0 (3.9)	17.0 (2.8)	20.0 (2.8)	6.8 (2.6)	2.9 (1.1)	5.3 (1.7)	9.0 (2.2)
15–17 (74.7)	43.9 (1.2)	17.4 (1.1)	18.1 (0.9)	3.4 (0.5)	3.8 (0.5)	3.6 (0.4)	9.8 (0.8)
≥18 (18.0)	44.9 (2.4)	27.2 (2.4)	13.5 (1.7)	2.1 (0.9)	3.2 (0.8)	2.3 (0.7)	6.6 (1.5)
Grade							
9 (25.1)	44.0 (1.8)	12.7 (1.3)	19.7 (1.7)	5.9 (1.2)	3.9 (0.8)	4.7 (0.8)	9.0 (1.2)
10 (25.1)	43.3 (2.5)	18.2 (1.8)	18.4 (1.6)	2.9 (0.6)	3.4 (0.7)	4.3 (0.8)	9.5 (1.1)
11 (24.7)	42.4 (1.8)	19.7 (1.9)	16.4 (1.3)	3.1 (0.7)	4.2 (0.8)	2.9 (0.5)	11.3 (1.3)
12 (25.1)	45.5 (2.4)	25.8 (1.9)	15.4 (1.5)	1.9 (0.6)	3.0 (0.6)	2.0 (0.5)	6.4 (1.3)
Race/ethnicity							
White (59.3)	46.4 (1.4)	24.0 (1.3)	13.7 (1.0)	2.0 (0.3)	3.1 (0.5)	1.8 (0.4)	8.9 (0.9)
Black (19.3)	38.0 (2.6)	5.5 (1.1)	27.3 (2.5)	9.1 (1.5)	4.0 (1.0)	6.4 (0.9)	9.7 (1.8)
Hispanic (16.8)	39.7 (2.0)	17.1 (2.0)	18.9 (1.8)	2.0 (0.6)	5.0 (1.0)	6.9 (1.2)	10.4 (1.6)
Other (4.5)	48.4 (4.6)	13.8 (2.5)	17.3 (2.8)	3.7 (1.6)	4.1 (1.7)	6.1 (2.2)	6.7 (1.9)
Frequency of drinking (days)[c]							
1 or 2 (45.9)	37.2 (1.5)	15.1 (1.1)	23.5 (1.0)	5.3 (0.7)	5.2 (0.7)	4.4 (0.6)	9.2 (0.8)
3–9 (39.2)	46.6 (1.6)	22.4 (1.6)	14.2 (1.1)	1.8 (0.4)	2.6 (0.6)	2.6 (0.5)	9.8 (1.2)
≥10 (15.0)	56.4 (2.7)	23.3 (2.4)	6.8 (1.2)	1.7 (0.9)	1.7 (0.6)	3.0 (0.8)	7.0 (1.3)
Frequency of binge drinking (days)[c]							
None (44.1)	33.6 (1.5)	14.6 (1.1)	25.6 (1.1)	6.1 (0.8)	6.6 (0.7)	4.4 (0.6)	9.2 (1.0)
1 or 2 (31.5)	50.0 (1.8)	18.5 (1.4)	14.0 (1.0)	1.9 (0.4)	2.2 (0.6)	3.4 (0.6)	10.0 (1.2)
≥3 (24.5)	54.2 (2.5)	28.0 (2.3)	7.0 (1.1)	0.5 (0.4)	0.4 (0.2)	2.0 (0.5)	7.9 (1.0)
Driving after drinking[c]							
No (75.9)	43.5 (1.2)	16.0 (0.9)	19.2 (0.8)	3.7 (0.5)	4.3 (0.5)	3.8 (0.5)	9.6 (0.8)
Yes (24.1)	44.4 (2.1)	29.5 (2.1)	11.7 (1.4)	2.5 (0.6)	1.7 (0.5)	2.6 (0.7)	7.7 (1.0)
Usual source of alcohol[d]							
Store (7.2)	45.4 (3.7)	31.9 (4.0)	10.4 (2.5)	2.5 (1.6)	2.8 (1.5)	2.8 (1.4)	4.1 (1.4)
Restaurant or bar (2.1)	51.2 (6.8)	11.3 (4.2)	17.2 (4.4)	0.0 (0.0)	3.6 (2.4)	4.1 (2.7)	12.6 (5.1)
Someone bought it for me (21.4)	47.1 (2.3)	23.6 (2.3)	16.8 (1.7)	1.3 (0.5)	1.8 (0.7)	1.8 (0.6)	7.5 (1.3)
Someone gave it to me (40.5)	39.9 (1.5)	18.4 (1.3)	20.6 (1.2)	3.9 (0.7)	3.5 (0.6)	3.4 (0.6)	10.3 (1.2)
Took it (9.5)	46.6 (3.0)	11.2 (2.3)	17.4 (2.8)	7.1 (1.5)	5.0 (1.5)	4.1 (1.1)	8.5 (1.6)
Other (19.4)	45.5 (2.2)	16.3 (1.6)	13.8 (1.8)	3.4 (0.8)	5.7 (1.1)	4.9 (0.8)	10.4 (1.3)

(continued on next page)

Table 1. *(continued)*

Characteristic (%)	Liquor	Beer	Malt beverages	Wine coolers	Wine	Other	No usual type
Usual location of drinking[e]							
My home (26.8)	38.4 (1.3)	13.9 (1.4)	20.2 (1.2)	5.4 (0.8)	8.8 (1.1)	4.2 (0.8)	9.1 (1.1)
Another person's home (55.9)	45.4 (1.5)	21.8 (1.4)	17.4 (1.0)	2.2 (0.4)	1.7 (0.3)	2.2 (0.3)	9.3 (0.9)
Restaurant or bar (5.3)	49.0 (5.1)	9.8 (2.3)	14.7 (3.3)	6.6 (1.8)	4.5 (1.8)	6.9 (1.9)	8.5 (2.1)
Public place (8.0)	37.9 (3.4)	29.1 (4.1)	13.9 (2.0)	2.3 (0.6)	1.1 (0.6)	5.2 (1.6)	10.5 (2.8)
Other (4.1)	62.5 (4.8)	9.8 (2.6)	9.3 (2.5)	4.8 (2.4)	2.1 (1.4)	7.8 (2.4)	3.7 (1.6)

Note: Weighted percentages of respondents in each stratum are shown in parentheses following the stratum label.
[a]The analysis is restricted to students who reported drinking at least one drink of alcohol on ≥1 days during the past 30 days; based on the question *During the past 30 days, what type of alcohol did you usually drink?*
[b]Data are from the Youth Risk Behavior Survey and are weighted to reflect student nonresponse and to provide estimates representative of the student populations of each state. Additional weighting factors were added to reflect the different sample sizes and student populations in each state. Data presented are representative of the overall student populations of all eight states combined.
[c]Data reflect the past 30 days. These variables were recoded to create three relatively similar sized groups, so that the SEs would not be large in any one group and to create categories based on our conceptualization of the meaning of low, medium, and high frequency of drinking and binge drinking. The original categories for frequency of drinking were 1 or 2 days, 3–5 days, 6–9 days, 10–19 days, 20–29 days, and all 30 days. The original categories for frequency of binge drinking were 0 days, 1 day, 2 days, 3–5 days, 6–9 days, 10–19 days, and ≥20 days.
[d]*Other* includes source of alcohol reported as *at a public event* or *other*.
[e]*Other* includes usual location of drinking reported as *at a public event*, *on school property*, or *in a car*; question not asked in Hawaii, North Dakota, or Vermont

beverages. There was a strong relationship between binge drinking and the usual type of alcohol consumed. Binge drinking was associated with a preference for liquor and a decreased preference for malt beverages, wine coolers, and wine.

Discussion

The present research advances the literature by providing the largest sample to date in which adolescent beverage preferences are measured. It is also the first population-based study to examine alcohol beverage preference among youth based on location of consumption, source of alcohol, and as a function of other health-risk behaviors. Liquor was the most popular beverage preference among almost half of youth drinkers, was almost twice as popular as the next most popular beverage category, was the beverage of choice in seven of eight states, and was the predominant beverage choice for virtually all demographic strata. Furthermore, liquor was disproportionately popular among those who were frequent drinkers or binge drinkers, and among those who reported a variety of other health-risk behaviors (e.g., drinking and driving, carrying a weapon, smoking, having multiple sexual partners or not using condoms).

Beer and malt-based flavored beverages (referred to as malt beverages in the current study) were the second and third most popular alcohol beverage choices among youth. Although beer was a slightly more popular beverage than malt beverages for those drinking more frequently, binge drinking, or drinking and driving, it was nonetheless surprising that malt beverages had a similar overall popularity as beer given the large advertising expenditures for beer relative to malt beverages.[29,30] Data from the Monitoring the Future Study demonstrates that the past-30-day prevalence of beer consumption, which was formerly the clear-cut alcoholic beverage of choice among youth, decreased from 47% to 34% between 1990 and 2008.[31] In many respects, beer and malt beverages are similar in that malt beverages are taxed like beer in most states, and are similar to beer in terms of their distribution patterns and sales venues. Viewed in this light, it may be that malt beverage split the portion of the youth alcohol market that formerly consisted of beer. On the other hand, many malt beverages are highly flavored, and therefore likely more appealing to youth tastes, particularly to those who are relatively new to alcohol consumption or who are female. Because the prevalence of alcohol consumption and binge drinking among girls has increased and is now similar to that of boys, this may partly account for gains for malt beverages compared with beer. Finally, malt beverages are often produced by liquor companies and may be used to build brand loyalty among those who may go on to drink liquor at a later stage in their drinking trajectories. Moreover, the marketing activity for liquor has increased dramatically in the past decade, particularly on cable TV and in media venues whose audiences are disproportionately youthful relative to the general population.[32]

An important finding of this paper is the pattern of a decreased preference for malt beverages and wine coolers

Table 2. Usual alcoholic beverage type[a] among 9th- to 12th-grade students by other health-risk behaviors—eight states combined,[b] % (SE)

Characteristic (%)	Liquor	Beer	Malt beverages	Wine coolers	Wine	Other	No usual type
Overall (*n*=7723)	43.8 (1.1)	19.2 (1.0)	17.4 (0.7)	3.4 (0.5)	3.7 (0.4)	3.5 (0.4)	9.1 (0.6)
Wear seat belt[c]							
Sometimes, mostly, always (84.8)	43.0 (1.2)	18.8 (1.0)	18.0 (0.7)	3.7 (0.5)	3.8 (0.4)	3.2 (0.4)	9.6 (0.8)
Never or rarely (15.3)	49.2 (2.3)	21.3 (2.4)	13.4 (2.1)	1.9 (1.0)	2.9 (0.9)	4.9 (1.0)	6.3 (1.2)
Rode in car with drinking driver[d]							
No (53.7)	42.5 (1.5)	17.0 (1.1)	19.2 (0.9)	3.2 (0.5)	5.1 (0.6)	3.5 (0.5)	9.6 (0.9)
Yes (46.3)	45.2 (1.5)	21.8 (1.7)	15.3 (1.1)	3.6 (0.7)	2.0 (0.4)	3.5 (0.5)	8.7 (0.9)
Carried a weapon[e]							
No (71.7)	40.8 (1.3)	19.5 (1.1)	19.8 (0.9)	3.4 (0.5)	4.0 (0.5)	2.9 (0.4)	9.5 (0.7)
Yes (28.4)	49.9 (1.9)	19.7 (1.6)	11.8 (1.2)	3.4 (1.0)	2.5 (0.6)	4.3 (0.6)	8.4 (1.1)
Have been in physical fight[f]							
No (55.2)	40.0 (1.6)	21.2 (1.2)	19.1 (1.2)	3.1 (0.5)	3.6 (0.4)	2.5 (0.4)	10.5 (1.0)
Yes (44.8)	48.4 (1.6)	17.1 (1.6)	15.2 (1.1)	3.7 (0.7)	3.8 (0.8)	4.7 (0.6)	7.2 (0.9)
Have felt sad or hopeless[g]							
No (65.1)	42.7 (1.4)	22.1 (1.2)	16.3 (0.8)	3.1 (0.6)	2.7 (0.4)	3.3 (0.4)	9.8 (0.8)
Yes (34.9)	45.8 (1.7)	13.7 (1.4)	19.3 (1.4)	4.0 (0.7)	5.4 (0.8)	3.8 (0.7)	8.0 (0.9)
Seriously considered suicide[h]							
No (81.2)	43.1 (1.4)	20.7 (1.1)	17.7 (0.1)	3.4 (0.5)	3.1 (0.4)	3.3 (0.4)	8.9 (0.8)
Yes (18.8)	47.3 (2.0)	13.0 (1.7)	15.4 (1.6)	3.5 (0.9)	6.1 (1.2)	4.4 (0.9)	10.5 (1.4)
Current smoker[i]							
No (63.6)	41.0 (1.6)	16.4 (1.2)	20.2 (1.0)	4.3 (0.7)	4.8 (0.5)	3.6 (0.4)	9.7 (0.9)
Yes (36.4)	47.9 (1.8)	24.4 (1.7)	13.1 (1.2)	1.7 (0.5)	1.7 (0.5)	3.0 (0.6)	8.1 (1.0)
Used marijuana[j]							
No (60.7)	40.5 (1.4)	17.0 (1.1)	20.4 (0.5)	3.8 (0.5)	5.1 (0.5)	3.7 (0.5)	9.7 (0.8)
Yes (39.4)	49.1 (1.6)	22.6 (1.6)	12.9 (1.0)	2.5 (0.6)	1.3 (0.4)	3.0 (0.5)	8.6 (0.9)
Hours of TV per day[k]							
<3 (63.0)	43.3 (1.5)	21.7 (1.3)	16.4 (0.8)	2.2 (0.3)	3.9 (0.5)	2.8 (0.4)	9.7 (0.9)
≥3 (37.0)	44.4 (1.9)	14.0 (1.3)	19.7 (1.5)	5.4 (0.9)	3.5 (0.6)	4.7 (0.6)	8.4 (1.0)
Number of sexual partners[l]							
None (46.6)	39.7 (2.2)	19.7 (1.7)	19.0 (1.5)	2.9 (0.6)	5.0 (0.7)	3.5 (0.6)	10.2 (1.1)
1 (35.5)	44.9 (1.9)	22.0 (2.0)	16.2 (1.6)	2.5 (0.7)	3.3 (0.7)	2.4 (0.6)	8.7 (1.4)
≥2 (17.9)	52.3 (3.4)	17.2 (2.7)	14.1 (2.3)	5.3 (1.9)	0.9 (0.6)	5.5 (1.5)	4.7 (1.2)

(continued on next page)

among older adolescents, accompanied by an increased preference for liquor and beer. The same pattern—a preference for beer and liquor instead of malt beverages and wine coolers—was associated with more frequent and riskier drinking behavior and with other types of addictive behaviors (i.e., smoking and marijuana use). This finding has potential implications for prevention, as it suggests that interventions aimed at young adolescents who drink wine coolers and malt beverages might help avert this transition to more hard-core alcohol and the

Table 2. *(continued)*

Characteristic (%)	Liquor	Beer	Malt beverages	Wine coolers	Wine	Other	No usual type
Had sex without condom[m]							
No (77.5)	42.1 (1.5)	19.5 (1.3)	18.3 (1.1)	3.7 (0.7)	3.8 (0.5)	3.4 (0.5)	9.2 (0.8)
Yes (22.5)	50.3 (2.4)	21.6 (2.3)	13.4 (1.8)	1.7 (0.7)	2.8 (0.9)	3.1 (0.9)	7.1 (1.6)

Note: Weighted percentages of respondents in each stratum are shown in parentheses following the stratum label.
[a]The analysis is restricted to students who reported drinking at least one drink of alcohol on ≥1 days during the past 30 days; based on the question *During the past 30 days, what type of alcohol did you usually drink?*
[b]Data are from the Youth Risk Behavior Survey. Data are weighted to reflect student nonresponse and to provide estimates representative of the student populations of each state. Additional weighting factors were added to reflect the different sample sizes and student populations in each state. Data presented are representative of the overall student populations of all eight states combined.
[c]*How often do you wear a seat belt when riding in a car driven by someone else?*
[d]*During the past 30 days, how many times did you ride in a car or other vehicle driven by someone who had been drinking alcohol?*
[e]*During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?*
[f]*During the past 12 months, how many times were you in a physical fight?*
[g]*During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?*
[h]*During the past 12 months, did you ever seriously consider attempting suicide?*
[i]Current smokers were respondents who reported having smoked ≥1 day during the past 30 days.
[j]*During the past 30 days, how many times did you use marijuana?*
[k]*On an average school day, how many hours do you watch TV?*
[l]*During the past 3 months, with how many people did you have sexual intercourse?*; question not asked in Georgia or Utah
[m]*The last time you had sexual intercourse, did you or your partner use a condom?*; question not asked in Georgia or Utah

associated adoption of heavier and riskier drinking patterns.

This study is subject to several limitations. First, underage youth may under-report how much they drink, although there are no data to suggest that this would skew self-reports of which alcoholic beverages actually were consumed. Second, these data are representative of students from public high schools and not necessarily representative of those who do not attend school or those who attend alternative schools or private schools. Furthermore, the study was a population-based study of eight states and was therefore not nationally representative. Third, there may have been some misclassification with respect to which beverage types were consumed.

Improved surveillance for beverage and brand preferences among youth will enable better understanding of how these factors related to youth drinking, particularly when these data are combined with data about price, availability, and access-related factors experienced by youth who drink alcohol. This will be an important next step to designing and promulgating additional interventions to reduce youth drinking and its consequences.

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References

1. CDC. Alcohol-related disease impact (ARDI). Atlanta GA: CDC, National Center for Chronic Disease Prevention and Health Promotion. apps.nccd.cdc.gov/ardi/homepage.aspx.
2. Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. Monitoring the Future national results on adolescent drug use: overview of key findings, 2008. Bethesda MD: National Institute on Drug Abuse, 2009. NIH Publication No. 09-7401.
3. Eaton DK, Kann L, Kinchen S, et al. Centers for Disease Control and Prevention Youth risk behavior surveillance, U.S., 2007. MMWR Surveill Summ 2008;57(4):1–131.
4. Newes-Adeyi G, Chen CM, Williams GD, Faden VB. Surveillance Report #74: trends in underage drinking in the U.S., 1991–2003. Bethesda MD: USDHHS, Public Health Service, NIH, National Institute on Alcohol Abuse and Alcoholism, 2005.
5. USDHHS. The Surgeon General's call to action to prevent and reduce underage drinking. Rockville MD: USDHHS, Office of the Surgeon General, 2007.
6. Bonnie RJ, O'Connell ME, eds. Committee on Developing a Strategy to Reduce and Prevent Underage Drinking, National Research Council and IOM. Reducing underage drinking: a collective responsibility. Washington DC: National Academy Press, 2004.
7. Kuntsche E, Knibbe R, Gmel G, Engels R. "I drink spirits to get drunk and block out my problems. . .": beverage preference, drinking motives and alcohol use in adolescence. Alcohol Alcohol 2006;41(5):566–73.
8. Smart RG, Walsh GW. Do some types of alcoholic beverages lead to more problems for adolescents? J Stud Alcohol 1995;56(1):35–8.

9. Kuntsche EN. Radicalisation? An interpretation model of adolescent alcohol use from 1986 to 1988 in Switzerland. Sucht 2001;47(6):393–403.
10. Naimi TS, Brewer RD, Miller JW, Okoro C, Mehrotra C. What do binge drinkers drink? Implications for alcohol control policy. Am J Prev Med 2007;33(3):188–93.
11. Clapp JD, Shillington AM. Environmental predictors of heavy episodic drinking. Am J Drug Alcohol Abuse 2001;27(2):301–13.
12. Rogers JD, Greenfield TK. Beer drinking accounts for most of the hazardous alcohol consumption reported in the U.S. J Stud Alcohol 1999;60(6):732–9.
13. Berger DE, Snortum JR. Alcoholic beverage preferences of drinking–driving violators. J Stud Alcohol 1985;46(3):232–9.
14. Klein H, Pittman DJ. Drinker prototypes in American society. J Subst Abuse 1990;2(3):299–316.
15. Jensen MK, Andersen AT, Sorensen TI, Becker U, Thorsen T, Gronbaek M. Alcoholic beverage preference and risk of becoming a heavy drinker. Epidemiol Community Health 2002;13(2):127–32.
16. Klatsky AL, Armstrong MA, Kipp H. Correlates of alcoholic beverage preference: traits of persons who choose wine, liquor or beer. Br J Addict 1990;85(10):1279–89.
17. Smart RG. Behavioral and social consequences related to the consumption of different beverage types. J Stud Alcohol 1996;57(1):77–84.
18. Snortum JR, Kremer LK, Berger DE. Alcoholic beverage preference as a public statement: self-concept and social image of college drinkers. J Stud Alcohol 1987;48(3):243–51.
19. Schmid H, TerBogt T, Godeau E, Hublet A, Dias SF, Fotiou A. Drunkenness among young people: a cross-national comparison. J Stud Alcohol 2003;64(5):650–1.
20. Roeber J, Green DL, Meurer KM, et al. Types of alcoholic beverages usually consumed by students in 9th–12th grades—four states, 2005. MMWR Morb Mortal Wkly Rep 2007;56(29):737–40.
21. Cremeens JL, Miller JW, Nelson DE, Brewer RD. Assessment of source and type of alcohol consumed by high school students: analyses from four states. J Addict Med 2009;3(4):204–10.
22. Brener ND, Kann L, Kinchen SA, et al. Methodology of the youth risk behavior surveillance system. MMWR Recomm Rep 2004;53(RR-12):1–13.
23. van den Bulck J, Beullens K. Television and music video exposure and adolescent alcohol use while going out. Alcohol Alcohol 2005;40(3):249–53.
24. Atkin CK. Effects of televised alcohol messages on teenage drinking patterns. J Adolesc Health Care 1990;11(1):10–24.
25. Tucker LA. Television's role regarding alcohol use among teenagers. Adolescence 1985;20(79):593–8.
26. Woodruff RS. A simple method for approximating the variance of a complicated estimate. J Am Stat Assoc 1971;66(334):411–4.
27. SAS Institute Inc. Variance estimation. SAS/STAT(R) 9.22 user's guide. Cary NC: SAS Institute Inc., 2010. support.sas.com/documentation/cdl/en/statug/63347/HTML/default/viewer.htm#statug_surveyfreq_a0000000212.htm.
28. U.S. Census Bureau. 2007 population estimates. T6-2007: Sex by age. Washington DC: U.S. Census Bureau, Population Estimates Program. factfinder.census.gov.
29. The Center on Alcohol Marketing and Youth. Youth exposure to alcohol advertising on television and in national magazines, 2001 to 2006. Washington DC: Center on Alcohol Marketing and Youth, Georgetown University, 2007.
30. Jernigan D, Ostroff J, Ross C, et al. Youth exposure to alcohol advertising in magazines—U.S., 2001–2005. MMWR Morb Mortal Wkly Rep 2007;56(30):763–7.
31. Johnston LD, O'Malley PM, Bachman JG, et al. Monitoring the Future national survey results on drug use, 1975–2008. Volume I: secondary school students. Bethesda MD: National Institute on Drug Abuse, 2009. NIH Publication No. 09-7402.
32. The Center on Alcohol Marketing and Youth. Youth exposure to alcohol advertising on television, 2001 to 2007. Washington DC: Center on Alcohol Marketing and Youth, Georgetown University, 2008.

Supplementary data

A pubcast created by the authors of this paper can be viewed at http://www.ajpm-online.net/content/video_pubcasts_collection.